

PATENT COOPERATION TREATY

PCT/EP2003/014774



Translation

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BASE/NAE737/	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPBA/416)	
International application No. PCT/EP2003/014774	International filing date (day/month/year) 23 December 2003 (23.12.2003)	Priority date (day/month/year) 23 December 2002 (23.12.2002)
International Patent Classification (IPC) or national classification and IPC C12N 15/82, C07K 14/415, A01H 5/00		
Applicant MAX-PLANCK-GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFT E.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 19 July 2004 (19.07.2004)	Date of completion of this report 29 December 2004 (29.12.2004)
Name and mailing address of the IPBA/EP	Authorized officer
Facsimile No.	Telephone No.

Form PCT/IPBA/409 (cover sheet) (July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/014774

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages _____ 1-37 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____ 1-46 _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the drawings:
pages _____ 1/6-6/6 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the sequence listing part of the description:
pages _____ 1-10 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig. _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(e)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under Item 1 and annexed to this report.

Form PCT/EPBA/409 (Box I) (July 1998)

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	45, 46	YES
	Claims	1, 3-25, 27-38, 42, 44	NO
Inventive step (IS)	Claims	45, 46	YES
	Claims	1-44	NO
Industrial applicability (IA)	Claims	1-46	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents:

- D1: BARATA R M ET AL: "Targeting of the soybean leghemoglobin to tobacco chloroplasts: Effects on aerobic metabolism in transgenic plants" PLANT SCIENCE (SHANNON), Vol. 155, No. 2, 29 June 2000 (2000-06-29), pages 193-202, XP002283115 ISSN: 0168-9452
- D2: WO 98/12913 A (BAILLY JAMES E; BULOW LEIF (SE)) 2 April 1998 (1998-04-02)
- D3: WO 99/02687 A (JARDINAUD MARIE FRANCOISE; PEACOCK WILLIAM JAMES (AU); COMMW SCIEN) 21 January 1999 (1999-01-21)
- D4: DATABASE EMBL [Online] EBI, Hinxton; 18 November 2000 (2000-11-18), UCHIUMI ET AL: "Genomic leghemoglobin genes from Lotus japonicus" XP002283119 Database accession no. AB042718
- D5: DATABASE EMBL [Online] EBI, Hinxton; 6 November 1997 (1997-11-06) TREVASKIS B ET AL: "Two hemoglobin genes in Arabidopsis thaliana: The evolutionary origins of leghemoglobins" XP002283120 Database accession no. U94999.

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NOVELTY (PCT Article 33(2))

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 1, 3-25, 27-38 and 42-44 is not novel within the meaning of PCT Article 33(2).

Document D1 discloses (the references between parentheses refer to D1) transformed tobacco plants expressing a soybean leghemoglobin gene in chloroplasts. The plants displayed a moderate increase in their saccharose and starch content (figure 4).

Document D2 discloses transformed plants expressing a (leg)hemoglobin of *Vitreoscilla*, soybean or lupine. The plants displayed greater growth and an increased nicotine and anabasine content. The gene can be expressed under the control of a tissue-specific promoter.

Document D3 discloses transformed plants expressing an *Arabidopsis thaliana* hemoglobin gene (HbAra I). HbAra I is identical to the present DNA sequences SEQ ID NO: 3 and 4. Expression occurs under the control of a seed-specific promoter (HMW, gluten). The plants display an increased concentration of available iron.

Document D4 discloses *Lotus corniculatus* var. *japonicus* leghemoglobin DNA and protein sequences which are identical to SEQ ID NO: 1 and 2.

Document D5 discloses *Arabidopsis thaliana* hemoglobin AHB2 DNA and protein sequences which are identical to SEQ ID NO: 5 and 6.

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INVENTIVE STEP (PCT Article 33(3))

The present application does not meet the requirements of PCT Article 33 (1) because the subject matter of claims 2, 26 and 39-41 does not involve an inventive step within the meaning of PCT Article 33(3).

Dependent claims 2, 26 and 39-41 contain no features which, combined with the features of any claim to which they refer, meet the PCT requirements for novelty and inventive step (see documents D1 and D4 and the relevant passages cited in the search report).

SUPPORT BY THE DESCRIPTION (PCT Article 6)

Contrary to PCT Article 6, claims 4, 9, 28 and 33 are not supported by the description.

The reasons are as follows: the embodiments described on pages 29, 31 and 33 (examples 10-12) and shown in tables 3-5 and figures 2-5 are not encompassed by the present claims, which describe the combination of the features "at least one leghemoglobin

and at least one hemoglobin" and "at least one sequence no. 1 coding for a leghemoglobin and at least one of the sequences no. 3 and 5 coding for a hemoglobin". This inconsistency between the claims and the description leads to doubt as to the subject matter for which protection is sought and hence the claims are not clear (PCT Article 6).

PTO/SB/97 (09-04)

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Application No. (if known): 10/540,063

Attorney Docket No.: 13311-00008-US

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